New shielding material reduces worker exposures

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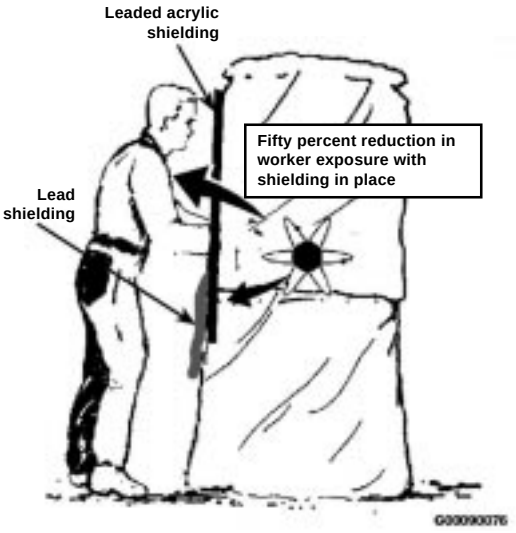

A team of CH2M HILL Hanford Group employees has significantly reduced worker risk during sampling of Hanford's huge underground tanks. CHG health physics technicians Mike Widdis and Mike Copeland, along with the tank farms operations organization, found a way to cut radiation doses in half by using a new shielding design.

Working for the Office of River Protection, CHG is sampling many of Hanford's 177 underground tanks to ensure safe storage and to prepare for transferring the waste to a vitrification, or treatment, plant.

On a standard sampling project, three to five samples are taken using a glove bag. Worker exposure levels on "hot" tanks are kept lower by the limited use of lead shielding. Crews practice the operation so that the "real thing" takes less than two minutes. The sampling is spread among several teams of employees, keeping the dose levels to any one worker within acceptable limits.

Sampling on one of the site's most radioactive tanks, double-shell Tank AZ-101, began in April. Pulling the samples was a major challenge because more than 70 samples were needed from Tank AZ-101. A new approach was needed to provide workers with more protection. HPTs Widdis and Copeland jumped on an idea they thought would reduce worker doses.

Someone had shown the two an advertisement for a relatively new shielding material — leaded acrylic. While thick panes of leaded glass have been used throughout the world for decades to protect workers from radiation, the heavy weight and high cost of the glass makes its use in the field impractical. Lead-filled "blankets" are used in the field, but are bulky and obstruct line-of-sight operations. The leaded acrylic was lighter, transparent, and promised a 50 percent reduction in exposure.

Widdis and Copeland researched the acrylic manufacturer's claims. Then they worked with operators and radiological control technicians to find a way to use the shielding in the glove bag design for Tank AZ-101. The design placed a large piece of the acrylic shielding between the radioactive sample and the worker.

To further reduce worker exposures, operator Bobby Campbell and his operations team reduced the time it takes to transfer a sample from the glove bag to a leaded container called a "pig." The container is used to transport the sample to a laboratory for analysis.

After careful planning and numerous hours of mock-up training, the sampling crews put the improved glove bag design into use. Careful monitoring during sampling showed the improved design and the acrylic shielding significantly reduced radiation exposure to the workers.

"Improvements in process and worker safety are very important as we work toward tank waste treatment," said Dale Allen, CHG project manager and senior vice president. "CHG is operating under a theme of safe project delivery. It means working safely, making progress, and sending our workers home at the end of the day in as good or better condition than when they came to work." ✦